

orders is not of that great importance with which it seems to be generally regarded. The leaves are truly verticillate in a certain portion of the *Cinchonaceæ*, and, without any violence to truth, they may be regarded as verticillate in the whole of these plants, in this way. All botanists will admit that stipules are merely reduced or rudimentary, partially-developed leaves. In *Galiaceæ* we have plants with leaves in whorls, all equally developed, but in many cases with an undoubted tendency to reduction in part of the whorl. In *Cinchonaceæ* a certain number of the leaves of the whorl are invariably much more fully developed than the others, which assume the character of stipules, but do not appear in the form of ordinary stipules, as appendages to other leaves, but occupy independent positions around the stem like true leaves. If the argument had proceeded in this direction, we should probably have had less discussion upon a point which still remains to be satisfactorily cleared up*.

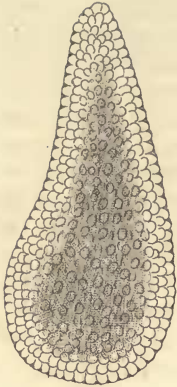
EXPLANATION OF PLATE IX.

- Fig. 1. Stipular gland of *Cinchona Calisaya*. 70 diameters.
 Fig. 2. Stipular gland of *Ixora coccinea*. 70 diameters.
 Fig. 3. Vertical section of gland of *Cinchona Calisaya* (after Weddell), showing (a) central nucleus of compact tissue, and (b) outer layer of elongated cells.
 Fig. 4. Diagrammatic view of two of the cells of the outer layer of the gland (*C. Calisaya*), exhibiting the canals (c, c) at their apex, as shown by Weddell.
 Fig. 5. Stipular gland of *Exostemma longiflora*. 70 diameters.
 Fig. 6. Twin gland from stipule of *Luculia Pinceana*, formed by the adhesion of two glands throughout the greater part of their length. This is only of occasional (accidental) occurrence, the usual form of the gland being not unlike that of *Exostemma longiflora*, but of greater size. 70 diameters.
 Fig. 7. Glands of *Galium saxatile*. 70 diameters.
 Fig. 8. Gland of *Crucianella stylosa*. 70 diameters.
 Fig. 9. Glands of *Galium cruciatum*. 70 diameters.
 Fig. 10. Gland of *Galium urceolatum*. 70 diameters.
 Fig. 11. Gland of *Asperula odorata*. 70 diameters.

XVIII.—*Miscellaneous Notes on the Fauna of Dacca, including remarks made on the line of march from Barrackpore to that Station.* By Capt. ROBERT C. TYTLER, of the 38th Regiment Bengal Native Light Infantry.

I HAVE already, in page 365, Ser. 2. vol. xiii. of this work, given my observations on the fauna of Barrackpore; I shall now add

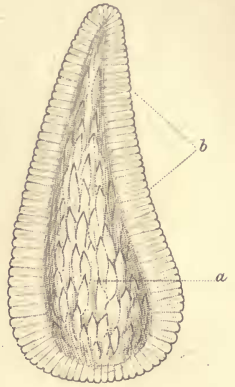
* To Professor Balfour, Mr. M'Nab, and Mr. Evans, my best thanks are due, for the unlimited use of plants from the Royal Botanic and Experimental Gardens, for examination.



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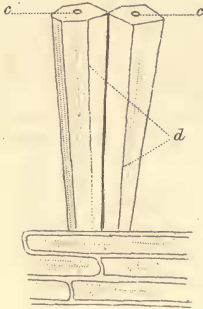
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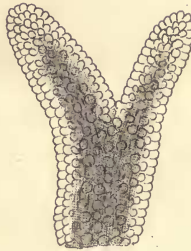
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some further remarks, confining myself solely to the few notes made during a most tedious march of twenty days from Barrackpore to Dacca, in company with my regiment. The entire distance between the two stations is about 180 miles, through a country intersected by numerous streams and rivers; these we had to cross almost daily, besides encountering various other difficulties; I had therefore to work under every kind of disadvantage, and was perfectly unable to make any minute observations on the journey; however, as opportunities offered, I lost no time in making the following notes, which although brief and scanty, may not altogether prove uninteresting.

The road from Barrackpore to Dacca is seldom employed for troops, for it frequently occurs that portions of the country become entirely inundated for months together, consequently quite impassable to land carriage; Europeans are therefore not very familiar with this part of Bengal, notwithstanding its proximity to the capital of India.

To as far as the civil station of Jessore, or even as far as Furrcepore, there is no very remarkable difference in the country, although the aspect decidedly gradually assumes a change; but after crossing the magnificent broad river Puddur, the difference is most observable: jungles become more wide and dense, and the whole country bears a different feature, which continues to the city of Dacca; this latter is both a civil and military station. European travellers now feel for the first time since leaving Calcutta, that they are fairly in the wilds of Hindostan, surrounded by swamps and unhealthy jungles, infested by tigers and numerous other ferocious as well as venomous animals. The unhealthiness of this portion of Bengal is proverbial, owing to the numerous swamps, the quantity of rank vegetation, coupled with the natural damp and heat that prevail during several months of the year. "*See Dacca and die*" is not an uncommon native saying. The reader may now imagine the style of country in which the few following notes were made during a stay of about five months, when sickness made a change of climate absolutely necessary.

To as far as Jessore the fauna is similar to that already mentioned of Barrackpore, with very slight exceptions; the larger species of Raptores observed at the last station become more common, and frequently very abundant, and after leaving Jessore I obtained two specimens of *Pomatorhinus leucogaster*, *Timalia pilcata* and *Aquila naviá*. I was astonished at getting specimens of *Pomatorhinus leucogaster*, their known habitats being Deyradhoon, Nepaul, Assam, and Tenasserim. The *Cuculus striatus* has become a most common species; their note is heard constantly during the day, and not unfrequently at night: the *Cuculus varius*

pair during April, for I had several opportunities of witnessing it; they are also exceedingly common.

When at Gunagutty enormous flights of the *Falcinellus igneus* flew over our camp; they are excellent eating and much sought after both by European and native sportsmen, and known to the former as the small Black Curlew. Owing to the numerous swamps the number of aquatic birds is surprising, and the country is perfectly dotted by the *Anastomus oscitans* and *Ciconia leucocephala*. I was fortunate in obtaining two eggs of this latter species, one of which is now in the museum of the Honourable East India Company, and the other in my own collection; they are larger than a hen's egg, and of a pure white colour. The *Plotus melanogaster* and *Graculus pygmaeus* are plentiful; the former is the well-known Snake-bird of India; both these species are peculiar in their habits, and may be seen constantly seated for hours, apparently motionless, on trees or stakes in or near water, watching their prey; they are also in constant attendance on the nets of fishermen, perching themselves familiarly on the nets; here they sit in solitary silence, occasionally spreading out their wings to dry in the burning sun, placing themselves while so doing in most eccentric attitudes. I had a splendid specimen of *Anas pæcilorhyncha* shot and sent to me by a brother officer, who mentioned seeing numbers in the same jheel where he killed this bird. I also obtained a very curious *Tringa*, of what species I am at present uncertain; it may prove to be only an albinoid variety of *T. minuta*. The *Lanius superciliosus* (Ind. var.) is quite disappearing, and the *Lanius nigriceps* is very common. The *Megalaima asiatica* and *Sciurus palmarum* become scarce, nor did I see one of either after crossing the river Puddur; so scarce seems the common Palm Squirrel of India, that the natives of Dacca are almost ignorant of its existence.

I observed large flocks of the *Larus brunnicephalus* fly down the stream of the river Puddur, as also a flock of that elegant duck, *Anas caryophyllacea*: the *Acridotheres ginginianus* and *Sphenura striata* are not uncommon on the banks of the same river; the latter confining themselves to the grass and bush jungle in the neighbourhood. I had several opportunities of observing the actions of *Glareola orientalis*; they are not uncommon; about dusk numbers are seen actively engaged, like swallows, in search of insects, which they take on the wing, to which latter birds their movements bear a great similarity.

Amongst the Raptores the *Haliaëtus macei* are very common; they are not choice in their selection of food, for I have seen them eating carrion in company with vultures and other carrion birds. Whilst on the subject of Raptores, I shall relate a curious circumstance connected with the habits of *Milvus ater* and *Ha-*

liastur indus, which I observed whilst sitting out in a field with several others after sunset:—A solitary white ant or termite was observed to fly out of a small hole near us, and went almost perpendicularly into the air; another and another followed in quick succession, till at length myriads formed a stream of living insects. Notwithstanding the lateness of the evening, several crows (*Corvus splendens*) observed the insects, and commenced cawing and flying about, but were too timid to approach, owing to our proximity; suddenly not less than fifty common kites (*Milvus ater*) made their appearance, and in less than a few seconds afterwards at least two hundred of these birds congregated together and attacked the termites; the birds flew within 20 feet over our heads, and notwithstanding the number collected, so graceful and exquisite were their movements, that no confusion, striking of wings, or jostling of each other could be observed, the birds passing and clearing themselves with the greatest nicety: the insects were invariably seized with their claws and instantly devoured. During this singular spectacle a Brahminee Kite (*Haliastur indus*) joined the party; the motions and actions of this bird, though equally graceful, were considerably more rapid than the other kites which showed no symptoms of timidity, but continued their feast till almost every insect disappeared. The birds now separated and flew off in various directions, so that in a few minutes scarcely one was to be seen. Where they came from and how they congregated so rapidly appeared quite a mystery.

I obtained a perfectly-formed egg from a female *Eudynamis orientalis* shot near Jessore in April, at which station five young *Viverra zibetha* were brought to me during the same month, as the young of *Canis aureus*. They had been dug out of a hole in the side of a bank, and appear not uncommon in this neighbourhood or at Dacca, where several adult specimens were brought to me, as well as of a *Paradoxurus*, which I have every reason to believe is *P. musanga*, although the ascribed habitat of this latter species is the Indian Archipelago. Specimens of *Herpestes griseus* are occasionally obtained, but by no means common; the *Pteropus edwardsii*, *Megaderma lyra*, *Nycticejus castaneus*, *Cynopterus marginatus*, and *Taphozous longimanus* are very plentiful; the *Kirivoula pictus*, of which I obtained and saw but two specimens, is excessively rare at Dacca. This elegant Bat is found in thick jungle, and is only observed when disturbed, by suddenly flying out of its retreat and taking almost immediate shelter like a moth among the bushes; the prevailing colour of this species is a bright orange, marked with black on the wings; this orange colour fades after the death of the animal into a dirty yellowish tint.

I have already mentioned that the *Sciurus palmarum* is un-

known at Dacca, but it is replaced by a fine species found in the jungles and by no means uncommon. The European residents as well as the natives appeared not to know of the existence of this animal, and were astonished at my bringing home several specimens; they were also found in mango topes and small orchards. This Squirrel is decidedly not *S. lokriah* of Hodgs., and appears to differ from *S. lokroides* of Hodgs., to which however it bears a strong resemblance and is closely allied. I would therefore, if the species is new, and I have every reason to believe it is, suggest for it the name of *S. blythii*, after my esteemed friend E. Blyth, Esq. The colour of this Squirrel is of a peculiar yellow-gray above; the whole of the under surface, as well as the inner side of the legs, are of a light gray; on the back the yellowish hue is most perceptible, sprinkled over with abundance of minute black marks; the whiskers are black; eyes full, brilliant and dark; the tail bushy and carried over the back; the inner part of the thighs is brownish; the entire length of the animal is 15 inches, of which the tail measures alone $7\frac{1}{2}$. They are by no means timid, but after being once disturbed and alarmed, run and hide among the branches and are most difficult to obtain.

One of the most common species of Mammalia, and which cannot fail to attract the notice of the most unobservant, are the common tame Otters of the fishermen in this neighbourhood (*Lutra chinensis*); several are kept by each family for the express purpose of catching fish, and the nicety with which they train and educate these Otters is extraordinary. I have invariably found them fishing in small streams, branches of rivers, or swamps; the method adopted is as follows:—a boat is usually fastened to a stake a few yards from the bank, the sides of the boat seldom exceeding a few inches in height from the surface of the water; the Otters, usually two or three, jump overboard and swim about the neighbourhood of the boat, diving and catching fish; these they carry to the side of the boat and drop in; the sport continues for several hours, the fishermen in the meantime remaining on shore otherwise engaged. Another mode adopted for fishing with Otters is to train these animals to drive fish into nets placed for that purpose.

The large Bengal Tiger (*Felis tigris*) and the common Leopard (*Felis leopardus*) are by no means uncommon, both species frequently visiting the neighbourhood of cantonments sufficiently near to render their presence anything but agreeable to the inhabitants. Leopards have been shot within the boundaries of cantonments. I had a magnificent specimen of *Felis viverrinus* sent to me. This species appears very rare, few of the older residents being aware of its occurrence at Dacca; the party who

brought it in persisted in believing it to be a variety of the common leopard, so large was this magnificent specimen in its dimensions.

Amongst the small Mammalia, the common House Rat requires further comparison; it is decidedly closely allied to *Mus indicus*, but of a considerably darker colour. This dark colour has also been remarked in specimens of *Mus indicus* received from southern India; but as the species found at Dacca seems to differ from both, to which, however, it is closely allied, I would suggest for it the name of *Mus daccaensis*, provided it is, as I have every reason to believe it to be, an undescribed species. The *Sorex murinus*, or common Musk Rat of Europeans, is very abundant, frequenting houses and other suitable localities.

When I arrived at Dacca, the number of *Megalaima lineata* about cantonments surprised me not a little; the call of this bird, which is a very abundant species, might be expressed thus: *kootur'r kootur'r kootur'r*, heard incessantly at intervals during the day. The *Megalaima asiatica* is not to be found, at least during the months I remained at Dacca. Several young of the former species were brought to me alive in the month of June; they live and thrive well in confinement, feeding freely on fruit, milk and bread, &c.; however, they are disagreeable pets, from the incessant noise they make. The *Centropus lathami* is also a common bird, found in bush jungle; the calls of this species vary, and are curious; one resembling the bark of the Bengal Fox (*Vulpes bengalensis*), whilst the other might be imitated thus: *clack, clack, clack, clack, clack, gouk, gouk, gouk, gouk, kurr, kurr, kurr, kurr, kurr, clack, clack, &c.* I was fortunate in obtaining the nest and egg of this bird during the month of June; the eggs are pure white, and very round in formation. The nest, which was composed of straw and grass, resembled a large ball supported on sticks, with a hole in the side for the bird to enter; the nest was well concealed, and with great difficulty discovered.

The *Leptoptilos argala* and *L. javanica* occasionally visit this neighbourhood. I was much interested in seeing in the possession of Major Graham, the executive officer, a specimen of a living *Leptoptilos*,—I should say *javanica*, but the bird was so young that I felt rather uncertain as to the exact species; from the scaly nature of the back feathers, it much resembled the latter species. I am aware that the young of *Leptoptilos argala* vary much in colour, judging from the young birds which visit Bengal; it is this, therefore, which causes me to hesitate about the young specimen alluded to. Major Graham found two young in the same nest, and not very far from Dacca; the nest was on a high tree.

There is a species of the genus *Caprimulgus* (*C. albonotatus*) common in cantonments; they fly about dusk, frequently sitting on the tops of houses, where they remain for hours calling in a most disagreeable manner; their note resembles *gouch, gouch, gouch*, varied occasionally by a hoarse sound resembling *bur'r'r'r'r gur'r'r'r'r*, &c. The *Corvus culminatus* is equally plentiful with the *Corvus splendens*. I may here mention that the *Iora typhia*, which is also common, assumes a much blacker appearance than those obtained at Barrackpore. The *Sphenura striata*, *Arundinax olivaceus*, and *Malacocercus earlei* are by no means uncommon; the latter are very plentiful, and found chiefly in bush and grass jungle. I also received good specimens of the following, comparatively speaking, common birds: *Halcyon gurial*, *H. syrnensis*, *Spizaetus linnaetus*, *Pontoaetus ichthyaetus*, *Bubo umbratus*, and *Ketupa ceylonensis*; the last two are fine large species, the first being easily recognized from the latter by its feathered feet, whereas the *Ketupa ceylonensis* has a naked yellow tarsus. The *Cuculus tenuirostris*, *Malacocercus bengalensis*, *Anthus richardi*, *Copsychus saularis*, *Tephrodornis pondicerianus*, as well as *Trichastoma abbotti*, are by no means uncommon; the latter species I had no conception was found in this part of Bengal, specimens having been received only from Arracan: that they breed at Dacca is beyond a doubt, for I obtained just-fledged young following the parent birds. The *Lanius nigriceps* is a very plentiful species, and the only examples I have seen at Dacca of this genus.

Several fine specimens of the *Hamatornis cheela*, and one of *Aquila navia*, have been brought to me; the former are constantly found near swampy ground, where specimens of the *Limosa egocephala*, *Charadrius virginicus*, and *Casarca rutila* (the *Chuckwa-chuckwee* of the natives, and the Brahminee Duck of Europeans) are found. In the dense thick jungle, numbers of the *Zanclostomus tristis*, *Chrysomma sinense*, *Francolinus vulgaris*, and a local variety? of *Turnix ocellatus* are found; occasionally a few *Oriolus indicus*, *Tantalus leucocephalus*, and *Plotus melanogaster* visit the station. The *Brachypternus aurantius* I have not seen, but find it plentifully replaced by the *Micropternus phaiiceps*, which is very abundant. The specimens of the *Tephrodornis pondicerianus* are whiter over the eye than the specimens I have received from elsewhere; this seems to be merely a local peculiarity. Numbers of *Acridotheres griseus* build in the old temples and houses about the sepoy's huts; this is rather curious, for at Mussoorie, in the Himalayas, they invariably select large trees for their nests. It is not unusual, during the hours of parade or drill in the morning, to see numbers of these birds feeding fearlessly near the soldiers. This reminds me of what I

have frequently seen in the *Acridotheres tristis* and *Sturnopastor contra*, that they become so accustomed, from living in the neighbourhood of regimental target butts, as to allow the balls to pass over them whilst they have fearlessly fed between the targets and the soldiers practising. Before the commencement of the rainy season, a pair of *Nettapus coromandelianus* built their nest amongst the branches of a large Peepul tree (*Ficus religiosa*) in the very centre of cantonments; and what was most extraordinary, the tree was situated at a great distance from water.

The birds occasionally brought for sale to the markets of the city are very interesting: the *Palæornis schisticeps*, at all times a rare bird in the markets of Bengal, are to be had; the *Gallixrex cristatus* and *Porzana akool* may also be purchased;—the natives keep them in cages as pets. Captain Middleton sent me a cage full of *Nectarinia goalpariensis*, which had been caught in the neighbourhood; these exquisite little creatures I kept for a very long while, feeding them on water and sugar, bread and milk, occasionally varying their diet with honey; the males sing in captivity, and soon become familiar and confiding in their dispositions. Few *Nectarinia zeylonica* are found, but the *Nectarinia asiatica* are common; the latter breed amongst the bushes; two or three nests were brought to me.

In the long grass jungle for several days I observed a small bird, excessively wild in its habit and apparently strong on the wing, and very difficult to approach, flying about, a specimen of which I eventually obtained, and subsequently several others, a couple of which I sent to Edward Blyth, Esq., in Calcutta, and which I took the liberty of calling after myself, namely *Cisticola tytleri*. In Appendix 6. of his preface to the Catalogue of the Birds in the Museum of the Asiatic Society, Calcutta, page xxvii, in No. 1935, *Cisticola erythrocephala*, Mr. Blyth makes the following remark:—"Albinoid, young? from the vicinity of Dacca, presented by Captain Tytler, 38th B.N.I. (Qu. n. s. *C. tytleri*, nobis.)" I allude to this simply because I obtained several specimens, and feel perfectly satisfied that it is distinct from *Cisticola erythrocephala* (Jerdon, Blyth) from S. India; they were observed to be building prior to my leaving Dacca.

In the neighbourhood of cantonments several specimens of that curious animal, *Caprolagus hispidus*, were shot and sent to me; the formation of this species resembles more the appearance of a tail-less rat than a rabbit or hare. Many doubts arise in the opinion of sportsmen as to its being good for food; but of this fact there is not the slightest doubt, for its flesh is equal to that of any hare. The ears are particularly short, and the hair coarse and stiff. The other hares found at the station are *Lepus ruficaudatus*, which are common, and another hare closely